United States Department of the Interior

U. S. GEOLOGICAL SURVEY

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607-266-0217

October 13, 2011

MEMORANDUM

To: Isabel Rodrigues, USEPA, New York, NY
From: David Eckhardt, USGS, Ithaca, NY
Subject: Review of FS Draft Report -- Cayuga County Groundwater Contamination Site

I have reviewed the Draft Final Remedial Investigation Report (dated 4/13/2011) for the Cayuga County Groundwater Contamination Site prepared by CDM and find that it provides a concise description of the Site and its remedial investigation. The report is well organized and well written. The following comments address several technical concerns that focus mainly on the hydrogeology of the Site. They are offered by report page and paragraph number with the intent to strengthen the technical issues that are presented. I have also written suggested revisions directly on several text pages, which are offered to improve the clarity, scope, and accuracy of the report.

1. ES-1(¶1), p. 1-6(¶4), and elsewhere: The pump/treatment well GW-PW-1 at Powerex should always be identified as in the shallow bedrock aquifer. Is this well location shown on any of the figures?
2. ES-5(¶1), p. 3-2(¶5), and p. 8-4: The USGS has a new report (2011) that summarizes 93 borehole geophysical logs at the Site, which should be referenced. Contact the USGS for the full citation information.
3. ES-6(¶6) and 7-3(¶1): TCE should be listed with the other three Site contaminants.
4. ES-6 (¶3), Table 3-1, and elsewhere in report: The D5 unit includes the lower Bertie (Fiddlers Green) *and its contact with the Camillus Shale.*
5. ES-7(¶2), ES-9(¶3), ES-10(¶1), p. 4-18(¶2), p. 5-19(¶3), p. 7-1(¶6), p. 7-2(¶1) and elsewhere: The listing of contaminated wells is inconsistent and often incomplete at these and other discussions in the text. Please update and verify these well listings of IC exceedances throughout the report. Also, water-quality results for wells EPA-11, B-59D3, and B-61D3 are not plotted in figures or discussed in the report, although these wells have IC exceedances (Powerex consultant data).
6. ES-9(¶4): Specify the dates that TCE was disposed into pits at Powerex.
7. Section 2.1.1 (p. 2-1) should note that the USGS compiled 30 borehole geophysical log suites from data provided by Powerex logging contractors in addition to logs conducted by USGS at 63 wells (as summarized in USGS, 2011).
8. p. 3-3(¶2): The Oriskany Sandstone (when present) is between the Onondaga and Manlius Formations.
9. p. 3-5(¶5): Direct recharge of the deep aquifers through vertical fractures is unlikely at EPA-3, 4, 6, 7, and 8, based on borehole logs and water-level profiles; it may occur,

however, in near EPA-2, B-33, B-42, B-43, and B-56, where significant high-angle borehole fractures were observed in shallow and intermediate units.

10. p. 3-7(¶3) and p. 3-13(¶3): A summary table of transmissivity data for the hydro-stratigraphic units was assembled by USGS and may be included in the report to support the statements that the deep bedrock units (and particularly the D3) typically have higher transmissivities than the shallow and intermediate units.
11. p. 3-12(¶5): Rock core from B-56 also showed significant vertical fractures in the shallow and intermediate units.
12. p. 3-14(¶3): Please check the monthly rainfall of 62.4 inches.
13. p. 4-1 (¶1): The CCDOH should be added to the list of data sources.
14. p. 4-16(¶3): The last sentence should read "... east of EPA-2" and not EPA-17.
15. p. 5-2, section 5.3.1: A discussion of Abiotic Degradation should be added to these processes, in view of recent private-industry research findings at Powerex wells.
16. Table 5.1 and section 5.4.1 (p. 5.5): Add IC density and a brief discussion of density-driven TCE DNAPL migration, since it has likely occurred at Powerex.
17. p. 5-12(¶1): The well list of MNA data is incomplete (missing B-52 to B58).
18. p. 5-18(¶2) and elsewhere: The contamination in the shallow bedrock and its extraction and treatment system at Powerex should be discussed in more detail, since this may be an important consideration in any remedial action. The Powerex extraction and treatment system is also not adequately addressed in the draft FS report, where its extraction efficiency (which has been decreasing in recent years) and treatment capacity (which has been less than 30 percent of the design maximum) should be addressed. The operators of the treatment system may argue that the system has served its purpose and may be abandoned, but in fact it needs to be strengthened. These aspects need to be considered in the FS, as they could be a key part of the ROD.
19. p. 5-20(¶3): A discussion should be added to describe seasonal *upward* flow induced by pressures from recharge to the confined D3 unit, which causes *upward* contaminant movement into intermediate units.
20. p. 5-21, section 5.7: The discussion of matrix diffusion needs more emphasis and detail, since it may be an important consideration in the remedial feasibility evaluation.
21. Table 2-2: Add land-surface elevations for wells B59 through B62.
22. Figure 3-1 (and Figure 1-1 in the Draft FS report): These tables contain several inaccuracies and omissions:
    (a) The Skaneateles Formation is >75 ft in thickness, but it is usually absent (eroded) or missing its full thickness at RI wells; the Mottville (silty sandstone) is older than the Delphi Station (shale) and should be listed below it;
    (b) The Marcellus Formation is typically about 50 feet thick and has three members – Union Springs, Cherry Valley, and Oatka Creek (oldest to youngest); its lithology is black shale with a thin interbedded limestone unit (Cherry Valley); it is sometimes absent (eroded) or missing its full thickness at RI wells.
    (c) The Onondaga Formation is Middle (not Lower) Devonian; the four members of the Onondaga consist of about 75 feet of crystalline and flinty limestone with some thin interbedded bentonites and argillaceous limestones; the unit thicknesses are correct in RI Fig. 3-1, but are incorrect in FS Fig. 1-1; the Onondaga unconformably overlies the limestone of the Manlius Formation (not the Rondout Formation); it is sometimes missing its full thickness at RI wells.
    (d) The Manlius is gray fine-grained limestone (upper) and shaly dolostone (lower).
    (e) The Rondout is Lower (not Late) Devonian and Upper Silurian dolostone (not limestone) with some thinly interbedded shales, notably in the upper part;
    (f) The Cobleskill is limestone (not dolostone);

(g) The Bertie Formation is typically about 80 feet thick, and has three members – Fiddlers Green (20 ft), Forge Hollow (53 ft), Oxbow (7 ft) (oldest to youngest); the Forge Hollow and Oxbow are gypsiferous dolostones; the upper 15 ft (± 5 ft) of the Forge Hollow Member has shaly gypsum/anhydrite beds that are often highly porous and transmissive solution voids; the Fiddlers green is massive dolostone; the D5 hydrologic unit includes the lower Fiddlers Green *and* its contact with the underlying Camillus Shale; the D6 exists only at the EPA-14 well and does not include any Bertie units.
(h) The Camillus is interbedded shale, dolostone, and evaporites.
(i) Add a note on the table that the "Stratigraphy" column corresponds to the colors of units shown in the geologic-section figures.

23. Figure 3-2: Add "Seneca River via Owasco Outlet" to the basin notation just below "City of Auburn."
24. Figure 3-3: The Hamilton Group (Dh symbol) mapped by Luther is actually the Marcellus (Dmr) in the explanation key; the Manlius Formation (Dhgm, Dm), the Roundout Formation (Dhgr, Dr), and other units also have different symbols; the Srp symbol on the map is not identified. Standardize the symbols or provide a brief note to explain why differences in symbols are needed.
25. Figures 3-6 and 3-7: Well B-51D5 (adjacent to EPA-2) intersects the Camillus Shale at 257 feet bls, and well EPA-25 intersects the Camillus Shale at 340 feet bls.
26. The occurrence of ICs in the drinking-water supply wells at the Village of Union Springs (CY-53 and CY-54) is scarcely discussed in the report, nor are the wells plotted on the map figures. Water-quality data are available from the CCDOH and may be included for the supply wells just as was done for residential wells sampled by CCDOH. These data, in part, were the initial reason the Site was listed.
27. Is the Site actually called the Cayuga County Groundwater Contamination Site? The RI and FS report titles omit the word *County*.

Please contact me to discuss any of the review comments. I would be happy to assist with additional review of revised materials.

Sincerely,

(signed)
David A.V. Eckhardt
Research Hydrologist